

# Monitoring Pump Station Performance

## 4501 Pump Station Monitor

### Application Note

#### 4501 Benefits:

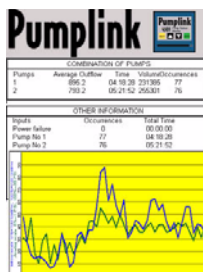
- Measures influent flow and pump capacity within 1% at pump stations with single speed pumps
- Provides early detection of potentially serious and costly pump station problems.
- No calibration needed; no level sensors to install
- Eight analog inputs and four digital inputs for logging other parameters, such as flow or level



4501 Pump Station Monitor

#### Pumplink Software:

- Trend analysis
- Reports
- Accuracy
- Fault Identification



*Teledyne Isco's 4501 Pump Station Monitor is the perfect tool for providing critical information on the flow rates, pump capacities, and performance of pump stations equipped with constant speed pumps.*

Sewer overflows can be avoided with proper pump station monitoring



#### Overview of Potential Pump Station Problems

Pump stations, also known as lift stations, are common components of many wastewater, storm water, industrial waste collection, conveyance, and treatment systems. Pump stations use one or more pumps to transport flow from one area to another. There are many problems that can potentially occur at a pump station.

Besides inflow and infiltration due to aging pipes, pipe blockages, and other collection system faults, an over sized or under sized pump station or inefficient pump operation can result in sanitary sewer overflows (SSOs) or combined sewer overflows (CSOs), thereby causing environmental pollution.

The pump station failure or malfunction can happen because of numerous equipment related problems such as:

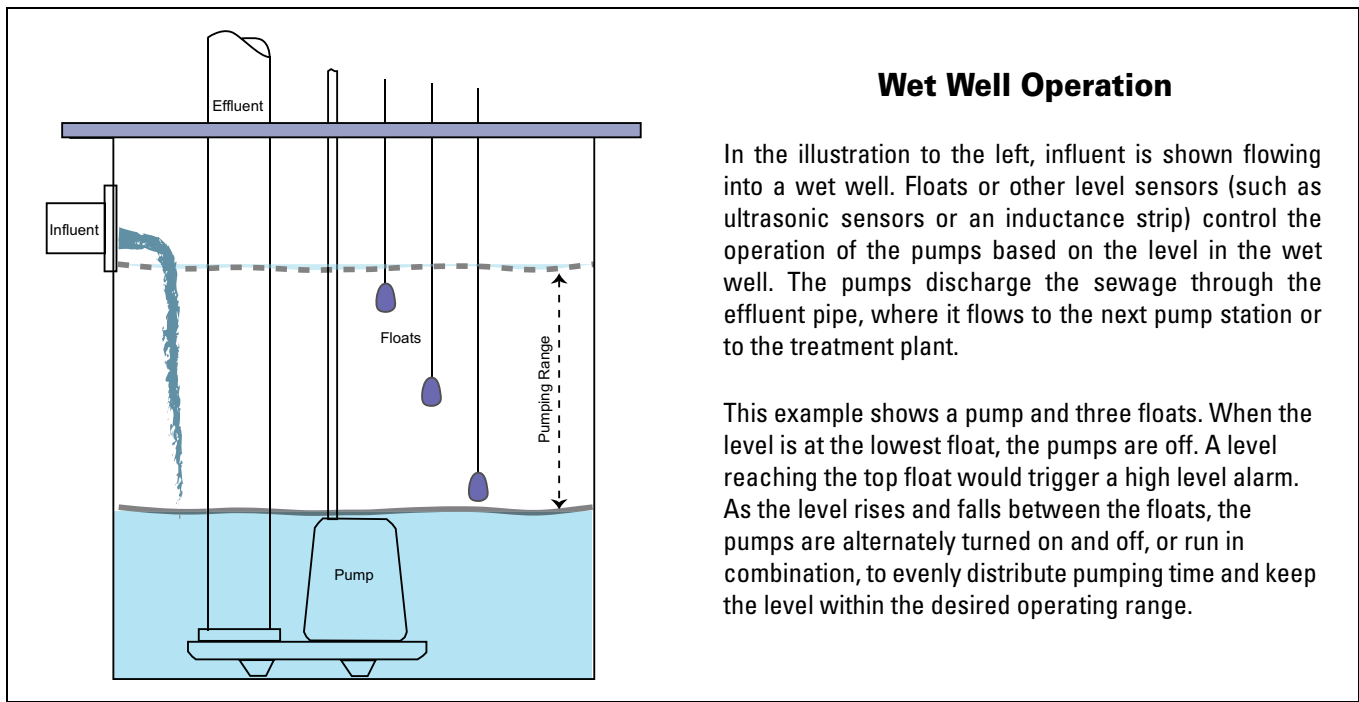
- alternator failures
- restricted intakes
- degradation in pumping rate
- jammed or worn impellers
- changes in level switches
- stuck check valves
- power failures
- float or wet well switch problems

#### Isco's 4501 Provides a Solution

Teledyne Isco's 4501 pump station monitor, used in conjunction with Pumplink software, is designed to identify many problems at a pump station long before they become serious, thus minimizing the risk of CSO and SSO occurrences.

Besides flow measurement, it monitors pump activity and individual pump performance, thus creating a performance history that can be used for diagnostic purposes.

Detection of intermittent problems and abnormal pump activity helps you schedule preventive maintenance to avoid major, expensive problems or system downtime.



## Wet Well Operation

In the illustration to the left, influent is shown flowing into a wet well. Floats or other level sensors (such as ultrasonic sensors or an inductance strip) control the operation of the pumps based on the level in the wet well. The pumps discharge the sewage through the effluent pipe, where it flows to the next pump station or to the treatment plant.

This example shows a pump and three floats. When the level is at the lowest float, the pumps are off. A level reaching the top float would trigger a high level alarm. As the level rises and falls between the floats, the pumps are alternately turned on and off, or run in combination, to evenly distribute pumping time and keep the level within the desired operating range.

## 4501 Features and Benefits

### Highly Accurate Data

For flow calculations to be accurate, the user needs to take varying inflow conditions and pump wear and tear into consideration. To calculate flow and pump rates, the 4501 uses knowledge of wet well volume along with patented algorithms that track varying inflow conditions, so flow can be measured within 1% accuracy. Pump activity data is stored for later analysis on a computer using Isco's Pumplink™ software.

### Data Retrieval and Analysis

Inflow, outflow, and pump capacities are quickly viewed via the 4501's front panel display. Complete logged data, daily and monthly reports, and event logs are downloaded and viewed using Pumplink software. With Pumplink's communication features, you can connect to the Isco 4501 Pump Station Monitor at remote locations to program the instrument and retrieve stored data.

### Early Detection of Problems

The data retrieval and analysis provided by the 4501 and Pumplink help you identify problems before they become serious.

You can avoid excessive power consumption, wear and tear on pumps, and minimize maintenance by detecting restricted intake, stuck check valves, jammed impellers, or changes in level switches.

### Programmable Alarms

Collection system conditions and performance are easily monitored due to the 4501 ability to set programmable alarm conditions.

Quick notification and early detection of abnormal pump activity, station performance, or intermittent problems helps you schedule proactive maintenance and avoid more serious problems later on.

### Event Logging

In addition to being a highly accurate flow monitor, the 4501 serves as an event logger that records pump station activities for up to three fixed speed pumps. Reviewing the event log gives you the ability to identify equipment problems before they result in a SSO or CSO.

### Multiple Inputs Supported

Additional inputs for both analog and digital information allow for the monitoring of a variety of devices. For example, you can connect to a rain gauge and log rainfall data to correlate with flow data at various pump stations through the collection system. This allows you to identify the impact of inflow and infiltration on each pump station, which allows you to focus maintenance activities where they are needed most.

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